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ABSTRACT

An extensive literature review led to the formation of a framework for vocabulary instruction that can be used to analyze the relationship between knowledge of word meanings and comprehension and to suggest more effective means of vocabulary instruction. The framework posits two types of information students hold about words--definitional and contextual. It further suggests that different vocabulary teaching methods provide different types of information about taught words and that methods that provide both definitional and contextual information or "mixed" methods are more effective than methods that provide only one type of information. The framework also suggests that methods vary in the processing demands they place on students and that methods that require "deeper" processing are also more effective. Depth of processing, at least in terms of vocabulary instruction, is operationalized in terms of three levels--association, comprehension, and generative processing. The framework was used to analyze the results of seven methods comparison studies and found to adequately account for the findings. (Author/FL)

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Vocabulary Instruction and the Nature of Word Meanings

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Abstract

This paper suggests a framework for vocabulary instruction, which can be used both to analyze the relation between knowledge of word meanings and comprehension and to suggest more effective vocabulary instruction. The framework suggests that we have two types of information about words we know--definitional knowledge and contextual knowledge. It is suggested that different vocabulary teaching methods provide different types of information about taught words, and that methods which provide both definitional and contextual information, or "mixed" methods are more effective than methods which provide only one type of information. Further, it was suggested that methods vary by the processing demands they place on students, and that methods which require "deeper" processing are also more effective. Depth of processing, at least in terms of vocabulary instruction, is operationalized in terms of three levels--Association, Comprehension, and Generative Processing. The framework was used to analyze the results of seven methods comparisons studies and found to adequately account for the findings.

Vocabulary Instruction and the Nature of Word Meanings

With all the recent interest in teaching reading comprehension in the middle grades, one area that has not received its fair share of attention is vocabulary instruction. On one hand, this is surprising, considering the strong relations between word knowledge and reading comprehension (Chall, 1958; Davis, 1968; Spearitt, 1972). On the other hand, there are many questions regarding vocabulary instruction that need to be answered in order to develop techniques of teaching word meanings effectively. I want to talk about two of those questions--Does teaching word meanings directly improve reading comprehension? and What is the most effective method of teaching vocabulary? I hope to propose some tentative answers as a framework for vocabulary instruction.

Vocabulary and Comprehension

Anderson and Freebody (1981) propose three possible explanations for the strong relations between word knowledge and reading comprehension. Word knowledge could be a reflection of the child's general ability, which in turn influences reading comprehension ability. Word knowledge is highly related to I.Q. and other measures of intellectual capacity (Terman, 1918; Sternberg and Powell, in press) and I.Q. is related to reading comprehension ability. Word knowledge could also reflect a child's general knowledge. Anderson and Freebody argue that, for example, a child who knows the meanings of

words such as "sari," "dhoti," etc. would be better able to read a passage written about Indian culture, even if those words do not appear in the passage, because knowledge of the meanings of those words implies a greater familiarity with the topic of Indian ritual and culture. Their third suggestion, which they term the instrumentalist hypothesis, suggests that knowledge of vocabulary has a direct effect on comprehension skill or that people who know more words read better by virtue of that knowledge. This third hypothesis is the one most directly related to teaching, since it suggests most strongly that teaching word meanings would improve comprehension.

The direct effects of vocabulary knowledge of comprehension have been tested two ways. First, in readability research, substitutions of less difficult words in passages have been found to aid comprehension (Chall, 1958; Wittrock, Marks, Doctorow, 1975). However such simplification appears most effective if the changes are substantial and other changes are also made in the text (Chall, 1958). Second, researchers have studied the effects of pre-teaching vocabulary on reading comprehension. Here the results are less clear-cut. Some studies have found significant improvement in comprehension resulting from vocabulary pre-teaching (Beck, Perfetti, McKeown, 1982; Kameenue, Carnine, Freschi, 1982; Stahl, 1982, in press). Others have found no effect (Ahlfors, 1979; Pany and Jenkins, 1977; Jenkins, Pany, Schreck, 1978; Schacter, 1978; Tuinman and Brady, 1974).

An analysis of the vocabulary pre-teaching studies (Stahl, 1982) suggests that two factors--breadth and depth--are related to the

success or failure of vocabulary pre-teaching. First, enough words must be taught. When small percentages of words appearing in passages are pre-taught, no effect on comprehension was found. The effects were found only when larger percentages of passage words were taught. This could be because readers can tolerate not knowing some words in passages and still comprehend the major ideas. When this percentage gets too high comprehension breaks down (Freebody and Anderson, 1981). This condition would be met by a long term vocabulary teaching program, whose cumulative effects might mean that many difficult words appearing in advanced texts would have been taught. Second, the words must be taught to a sufficient depth, or that the words must be learned well, in order for vocabulary instruction to be effective (Beck et al., 1982). This leads to our second question--What do we mean by teaching words well? This question can best be answered by looking at both the content of vocabulary instruction, or what information a vocabulary teaching program provides about to be learned words and the processes students use while studying new words.

Effective Vocabulary Learning

Definitional and Contextual Information Vocabulary teaching methods can be classified by the types of information they provide about words they teach. Some programs give synonyms, others full definitions and still others use words in context. What types of information would a program have to teach in order to give students a "full" sense of a words meaning? A review of research in cognitive psychology, linguistics, and psycholinguistics indicated that a

person who knows a word might be thought to have two types of knowledge about that word--definitional knowledge and contextual knowledge (Stahl, 1982). Definitional knowledge can be defined as the knowledge of the relations of a word to other known words. This could be called the standard picture of word meaning, or the dictionary view of meaning. This view has been translated into network models of semantic memory (e.g. Collins and Loftus, 1975), as shown in Figure 1. In such models, the meaning of a word such as "salmon"

Insert Figure 1 about here

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is its relations to other words, such as "a salmon is a fish" etc. In this form, cognitive psychologists have tested the definitional view. Without going into specific results, the findings of these studies are mixed. On one hand definitional knowledge appears to have some psychological reality. On the other hand, definitional knowledge does not seem to be sufficient. Most important, are the finding that we do not normally decompose words into their definitions while comprehending words in context. Another type of knowledge, contextual knowledge, appears necessary to describe word meaning. Contextual knowledge is defined as the knowledge of a core concept and how that concept is realized in different contexts. The different types of knowledge can be demonstrated with the verb "smoke." "To smoke" is to "inhale and puff the smoke of a cigarette, etc." This would be an example of definitional knowledge

of the concept. However, the word means slightly different things in different sentences, such as:

1. The man smoked the cigargette.
2. The psychologist smoked his pipe.
3. The Hippie smoked his marijuana cigarette.
4. The 13-year old smoked his first cigarette.

In all these sentences, the definition of "smoke" would be the same. However, the actions described by this definition differ. In the first case, the sentence describes a prototypical smoking action, in the second a puffing rather than inhaling, in the third case a long inhalation and a slow exhalation, and in the fourth case an inhalation followed by a cough. While the core meaning of "smoke" remains constant, this core meaning is realized differently in the different sentence contexts. In order to know "smoke," one must know both the core meaning and how it can be changed in different sentences (see Anderson and Ortony, 1975) or definitional and contextual aspects of word meaning are both necessary to have a "full" knowledge of a word.

One principle of effective vocabulary instruction would, then, appear to be that the teacher or materials should provide both definitional and contextual information about words to be taught. Programs that do this I will call "mixed" methods. In vocabulary methods comparison studies mixed methods do generally appear to be more effective than methods which provide only definitional or contextual information.

Table 1 reviews 7 recent vocabulary methods comparison studies

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Insert Table 1 about here

In six of the seven studies, mixed methods had significantly stronger effects on vocabulary learning than definitional methods. The seventh study, the Margosein, Pascarella & Pflaum study, will be reviewed after the discussion about the second demension of this framework.

Mixed methods may be more effective because the information provided about each word is fuller or more complete than that provided by definitional methods. Children do learn words using purely definitional methods. My observations of vocabulary instruction indicate, however, that children given only definitional information tend to provide their own contextualizations. For example, after one class of students found that "abrupt" means "sudden," they were asked to put the definition in their own words. One child said "like a sudden stop, could it be an abrupt stop?" We then discussed differences between "abrupt" or "sudden" in different contexts, adding a great deal of contextual information while I as a teacher/researcher was trying to limit the lessons to definitional information only. If students provide their own contextualizations, as they did in my lessons, a purely definitional lesson may be difficult to do, as well as undesirable.

Another reason that these mixed methods may have been more effective is that, for the most part, they required students to engage in different types of processing than most of the definitional treatments.

Student Processing and Vocabulary Learning

Studies of list learning have found that having people process information at greater "depth" increases the likelihood of that information being recalled (Craik and Tulving, 1975). Greater "depth" of processing, defined as either making a larger number of connections between new and known information (J.R. Anderson and Reder, 1978) or in terms of "cognitive effort" (Tyler, Hertel, McCallum, & Ellis, 1979), has been found to have powerful effects on learning with school aged children (Geis & Hall, 1976; Murphy & Brown, 1975; Owings & Baumeister, 1979; Weiss, Robinson, & Hastie, 1977), as well as with adults (e.g. Cermak and Craik, 1979; Hyde & Jenkins, 1973; Johnson-Laird, Gibbs, deMowbray, 1978).

In these studies, "depth" has been defined only intuitively. This is a very vague notion, and hard to measure exactly (Baddesley, 1978; Lockhart & Craik, 1978). But even with this vague definition, subjective judgements of the depth of processing required by a learning task have been found to have high interrater reliability and also predict how effective that task might be (Seamon & Vironstek, 1978). Applying our intuition to vocabulary learning tasks, it might be possible to define three broad levels of processing requirements, which might be useful in planning instruction:

Associate processing or having a child learn an association between a word and its synonym or definition, or with a particular context. A child who learns a list of synonyms does not necessarily comprehend them, since a list learning task can be accomplished without any consideration of the meanings of the words on the list. Similarly, a child who finds a word in a particular context does not necessarily comprehend the meaning of that word in the context. Mere exposure to words in context, even multiple exposures, does not necessarily lead to learning (Gray & Holmes, 1936; Sachs, 1943).

Comprehension processing or having a child understand the meaning of a particular association. This involves having the child do something with the association, reading it in context or doing something with the definition, such as learning an antonym.

Generative processing or having a student generate a novel context or definition for a word. This might involve restating a definition in the child's own words, or making up a novel sentence containing the word, etc. The process of generation seems to involve more mental effort than comprehension (Slamecka & Graf, 1978), possibly because it is a more active process.

If these represent three successively deeper levels of processing, then we might expect that methods which require students to use generative processing might be more effective than those which require only comprehension or associative levels. The results of vocabulary methods comparison studies, reviewed on Table 1, are generally consistent with this framework. With only two exceptions,

the most effective word study techniques were mixed methods which required the deepest level of processing.

In both the Margosein, Pascarella, & Pflaum study (1982) and my (in press) study, both treatments required all three intuitively defined levels of processing. In my study, both the mixed and definitional treatments required roughly equal amount of processing. The mixed treatment had students study synonyms, discuss the meanings of the study words in sentences which were provided for them, and have students generate their own sentences. The definitional treatment had students first look words up in the dictionary, discuss the definitions, and re-state the definitions in their own words, which were intended to be roughly parallel activities to those in the mixed treatment. The mixed treatment produced significantly higher scores on three of the four measures used.

In the Margosein et al. (1982) study, the mixed treatment was modelled after the Context method studies by Gipe in which students read a paragraph for each study word. The paragraph contained both the word used in a sentence, a definition and a command to write something about each word. Their definitional treatment was a more elaborate procedure, which they termed "semantic mapping." In this treatment, the students first discussed how two near synonyms were similar in meaning and how they differed. Next, a third word, such as "solitude", is discussed in relation to the first two, creating a "map" of the relations between the three words. This semantic mapping could be expected to lead to more elaborate connections

between the new information (the word "solitude") and known information (the general concepts and experiences of loneliness). These more elaborate connections may have led to its superiority over Gipe's Context method. Also, in the discussions, a great deal of contextual information may have come out, thus this method may have been mixed in practice while definitional on paper.

Implications

Successful teaching, in vocabulary or elsewhere, involves the interaction between the teacher, the student, and the materials. From the studies reviewed, it might be suggested that effective vocabulary instructional materials should provide the student with both definitional and contextual information. In practice, this generally means using a variety of different exercises, some of which stress definitions and others which present the word in context. Table 2 contains examples of different types of vocabulary teaching techniques.

Insert Table 2 about here

Some of these might be best suited to whole class or small group discussion, while others might be better suited for practice or review worksheets. Use of discussion to introduce words appears to be more effective than just doing worksheets (Barron & Melnik, 1973; Stahl, 1982), so open discussion should be encouraged. One might introduce words with a group activity, possibly semantic mapping, discussing the meanings of words in sentences, etc. This can be

reinforced by work with worksheets, using complimentary techniques.

When one is choosing activities, it is important to take into account the student's role in processing information. Activities should be chosen, and discussion monitored, so that the students involve as much of their mental effort as possible in learning the new words. In a practical sense, this involves choosing activities at different levels of processing from Table 2. It is important to involve each child in not only rote memorization but also in comprehension and generative activities involving new words.

The teacher chooses the activities that form an effective vocabulary learning program, leads discussion in order to increase the students involvement with the meanings of new words, and motivates children to not only learn the words that are taught, but also become more interested in learning other words that are met in context (Beck, Perfetti, McKeown, 1982). An effective and consistent vocabulary teaching program can have an effect on students comprehension skills. The framework discussed here may be a way for teachers to improve vocabulary instruction and through such improved instruction, lead students to be able to understand more difficult texts.

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Table 1

Methods Comparison Studies in Vocabulary Instruction

Study	Grade(s) Studied	Methods Compared (author's names)	Information Provided	Processing Requirements		
				Association	Comprehension	Generation
Ahlfors (1978)	6th grade	Definition	Definitional	X		
		SENTENCE CONTEXT	Mixed[a]	X	X	X
Anderson and Kulhavy (1972)	Undergraduate	Definition	Definitional	X		
		DEFINITION PLUS SENTENCE	Mixed	X	X	
Crist and Petrone (1977)	Undergraduates	Definitional	Definitional	X		
		CONTEXT	Mixed[a]	X	X	X
Gipe (1979)	3rd and 5th	Association	Definitional	X		
		Category	Definitional	X		
		Definition	Definitional	X		
		CONTEXT	Mixed	X	X	X
Johnson and Stratton (1966)	Undergraduates	Synonym	Definitional	X		
		Definition	Definitional	X		
		Classification	Definitional	X		
		Sentence	Contextual	X		
		MIXED	Mixed	X	X	
Margosein, Pascarella, Pflaum (1982)	Junior High	Context (from Gipe)	Mixed	X	X	X
		SEMANTIC MAPPING	Definitional	X	X	X
Stahl (1982 in press)	5th	Definitional	Definitional	X	X	X
		MIXED	Mixed	X	X	X

Footnotes to Table 1

Note: Most effective method is in capital letters.

[a]In Crist and Petrone's and Ahlfor's studies, students were given words in sentence contexts and asked to derive definitions. Therefore, these could be classed as "mixed" methods.

Table 2
Sample Vocabulary Study Methods, by Type of Information Provided and Processing Requirements

Processing Requirements

	Definitional Methods	Contextual Methods
Associative	Association Announce - say in public Dictionary or Glossary study Announce - to tell public about; proclaim Categorization Ways of talking speaking whispering announcing shouting	Wide Reading
Comprehension	Antonyms What word means the opposite of "announce"? a. shout b. keep secret c. a pound Word Parts What does "announcement" mean? "announcer"?	Sentence Reading What does "announce" mean in the sentence: "The boy announced his engagement to his parents." Sentence Cloze The winner was _____ at midnight. Rewriting Sentences Use "announce" in this sentence: His name was told publically today. Choosing Correct Usage In which of these sentences is "announce" used incorrectly? a. The man announced his choice. b. The store announced that it was going out of business. c. The little girl announced her ABCs correctly.
Generative	Restatement of Definitions Tell me what "announce" means in your own words. Semantic Mapping Discuss "tell" and "whisper," then discuss how "announce" is similar and different.	Writing Own Sentences Write a sentence using the word "announce."

Figure 1

A Piece of Semantic Memory as Conceptualized by

Collins and Loftus (1975)